

PROGRESS REPORT

Survival and Performance of Tip-Blight Infected Loblolly Pine

Gew

- Interim Report -

by

Charles E. Affeltranger

Introduction

In the summer of 1979 a nursery outbreak of tip blight on slash and loblolly pines prompted an outplanting of loblolly pine seedlings by personnel of Forest Pest Management (Alexandria) to evaluate survival and performance of the diseased individuals in the field. Incidence of the disease, whose cause is still uncertain, was relatively low--1.5 percent (Affeltranger and Ryan, 1980). Nevertheless, loblolly seedlings with the characteristic tip killing or brown needles around recovered terminals were selected for outplanting. All seedlings had been sprayed bi-weekly from August 1 to September 30, 1979, with benlate and/or daconil sprays at the recommended rates.

Purpose of the outplanting is to determine if affected nursery seedlings should be rogued or culled in the beds before lifting or if control in the nursery is even necessary. Outplanting results of trees affected by similar diseases such as Diplodia twig and needle blight are not available (Petersen, personal communication).

Materials and Methods

At lifting time 500 disease free seedlings with a root collar diameter of 1/8 inch or more and 500 seedlings with 1-25 percent tip and foliage symptoms by area, and a similar root collar diameter were lifted. From these two disease categories 125 seedlings in each category were selected for outplanting at each of two sites; one at the Stuart Seed Orchard of the Kisatchie National Forest near Pollock, Louisiana, and the other near Tallahala Creek on the Strong River Ranger District of the Bienville National Forest, Mississippi.

Treatment rows contained twenty-five seedlings and were replicated five times. Trees were planted at an 8' by 8' spacing, one commonly used on Louisiana and Mississippi National Forests. The seedlings were handplanted in mid-December, 1979.

In June of 1980 survival counts were made of seedlings at the Stuart Seed Orchard. Seedlings on the Bienville National Forest were not evaluated at this time.

In December of 1980 seedlings at both sites were evaluated for survival. height and root collar diameter measurements

RESULTS

From the June survival data taken at the Stuart Seed Orchard, it will be seen that only an eight percent reduction in survival occurred (Table 1). The healthy seedlings survived only slightly better than the infected ones.

Table 1. Six month evaluation of survival of tip-blight infected and noninfected loblolly seedlings planted at the Stuart Seed Orchard near Pollock, Louisiana, June 1980.

% SURVIVAL						
	REPLICATE					AVERAGE
	1	2	3	4	5	
Tip Blighted	96	96	96	84	84	91.2 ±
Non-infected	100	100	100	100	96	99.2 ±

However, based on the December 1980 data, a very different pattern of survival emerges. Overall survival of seedlings at both sites was lower than in June with the seedlings in the Stuart Seed Orchard showing the greater reduction in survival (Table 2).

Table 2. Survival percentages of tip-blight infected and non-infected loblolly pine seedlings planted at the Stuart Seed Orchard, (STU) and the Bienville NF (BNF), December, 1980.

		% SURVIVAL				
TREATMENT		REPLICATE				
		1	2	3	4	5
		AVERAGE				
STU	Diseased	40	68	28	36	48
STU	Control	68	80	80	52	64
BNF	Diseased	84	60	80	96	76
BNF	Control	92	84	92	88	88

At the Stuart reduction of 30% in the survival of control seedlings and a reduction of 47% in the survival of diseased seedlings was seen as compared to the June reading. The survival rates seen at the Bienville site were significantly higher at the December reading than those observed at the Stuart site.

Survival on both sites was better among the control seedlings than the diseased ones.

Comparisons of the height and diameter data collected one year from outplanting are presented in Tables 3 and 4. It will be readily appreciated that on both sites there was approximately a 5 cm difference in height between the larger control trees and the diseased trees. A similar difference was observed in the root collar measurements; diseased trees on both sites having about .1 cm smaller average root / collar diameter than the control trees. Averages at both sites were based only on surviving trees.

Table 3. Heights (cm.) of tip-blight infected and non-infected loblolly pine seedlings planted at the Stuart Seed Orchard, (STU) and the Bienville NF (BNF), December, 1980.

		SEEDLING HEIGHT (cm.)				
CONDITION		REPLICATE				
		1	2	3	4	5
		AVERAGE				
STU	Diseased	36.1	33.0	28.2	37.8	26.7
STU	Control	45.2	41.9	45.7	44.7	42.4
BNF	Diseased	28.2	25.3	35.5	29.0	34.1
BNF	Control	38.9	31.8	36.4	40.9	39.5

Table 4. Root collar diameter (cm.) of tip-blight infected and non-infected loblolly pine seedlings planted at the Stuart Seed Orchard (STU) and the Bienville NF (BNF), December, 1980.

ROOT COLLAR DIAMETER (cm.)						
CONDITION		REPLICATE				
		1	2	3	4	5
STU	Diseased	.53	.45	.43	.53	.38
STU	Control	.67	.64	.67	.60	.60
BNF	Diseased	.53	.41	.56	.44	.48
BNF	Control	.58	.54	.56	.61	.71

DISCUSSION

It is generally believed that damaged pine seedlings will survive outplanting if less than two inches of the terminal is killed back or if the seedling recovers in the nursery by initiating new terminals. This theory does not consider the effect that a prolonged drought has on seedlings already weakened by disease.

At the Stuart Orchard the site is well-drained with perhaps a 5 percent slope, an extensive grass ground cover and no standing water near the planting. At the June 1, 1980 reading the difference in survival between seedling condition was only 8 percent but had increased to 25 percent by December. In the intervening six months long periods of drought prevailed. Rainfall was less than five inches from June through September. Rough field observations in December revealed dead, 12-18 inch tall, tip-blighted seedlings, which had been alive in June. They appeared drought killed.

The site at Tallahala Creek on the Bienville National Forest, by contrast, was flat with a less extensive grass cover and standing water near the plot, which is located in a clearcut. The December reading indicated a difference of only 10 percent in survival between treatments. While drought undoubtedly occurred here, the wetness of the site apparently modified its effect.

Because of the survival difference at the Stuart Orchard, readings will continue on an annual basis at both sites as discussed in the work plan.

The non-infected seedlings at outplanting (December 1979) had a 1 1/2 - 2 1/2 inch height and a .03 to .04 inch diameter advantage at both sites. The December 1980 readings revealed only a slight increase in the height and diameter advantage with the Bienville seedlings and a

slight reduction in advantage with both measurements at Stuart. Essentially the initial advantage in height and diameter has been retained by the non-infected seedlings.

References Cited

Affeltranger, Charles E. and George W. Ryan 1980. Detection and incidence of tip blight of loblolly pine at the W. W. Ashe Nursery. USDA, FS, S&PF, FPM (Alexandria), Report No. 81-2-6 (5 pages).

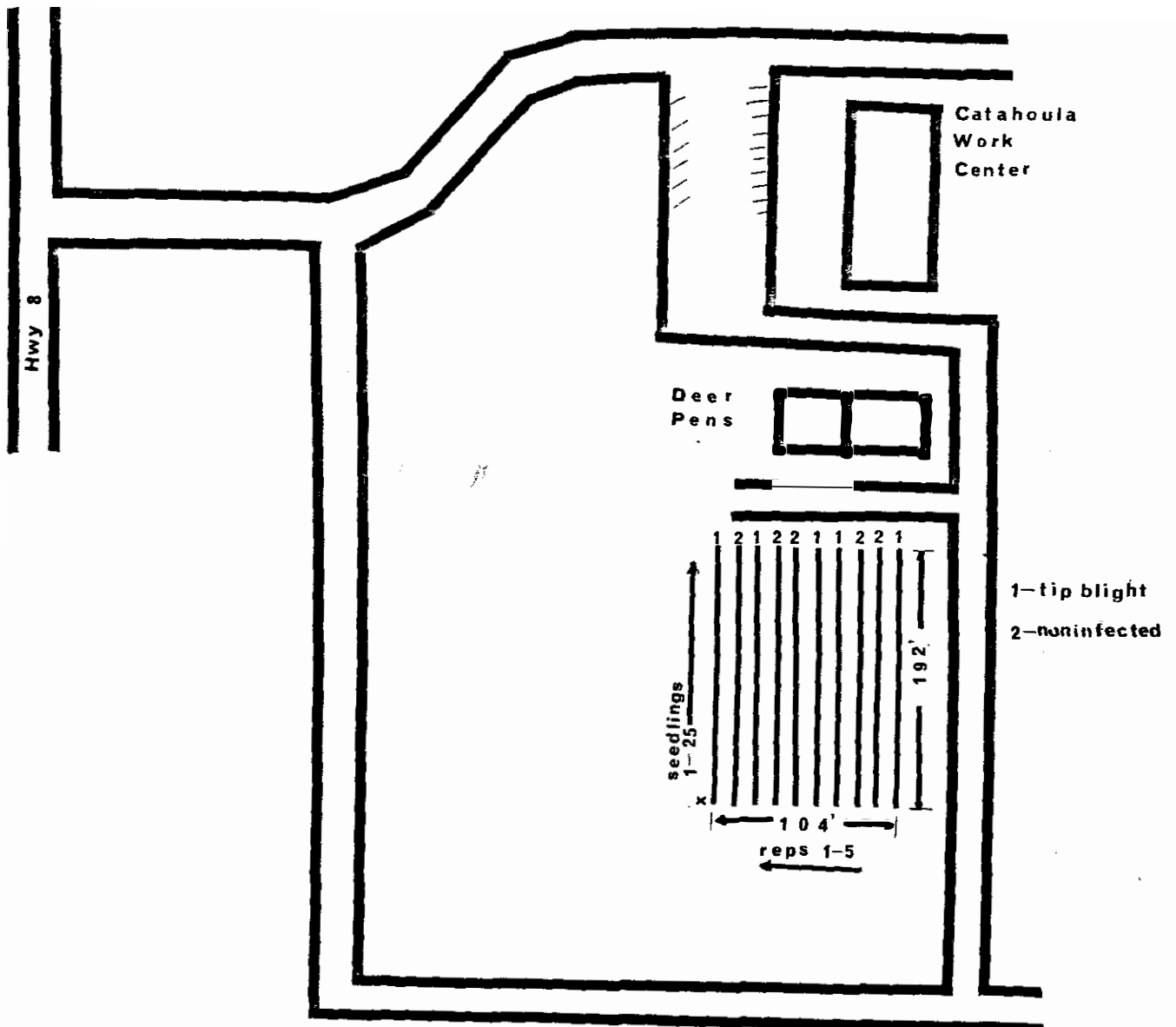
APPENDIX

Tip Blight Outplanting Sites

Stuart Seed Orchard - Pollock, La.

Kisatchie National Forest - Catahoula Work Center

Established - December 21, 1979



Bienville National Forest - Forest, Mississippi

Strong River Ranger District - Tallahala, Creek

Established - December 19, 1979

